

# **Building on CDAT: Application development**

## Why build on top of CDAT?

- It has a standard and universal scripting language interface (our old friend *Python*).
- It provides access to a range of useful packages such for data plotting, I/O, manipulation, processing etc.,
- Python binds easily to other languages and software packages.
- A critical mass of scientists working on CDAT packages will result in a suite of fantastic freely available routines that can be distributed in future releases.



## What would you build on top of CDAT?

- Some examples are:
  - The CF-checking utility (Hadley Centre/BADC)
  - BADC ERA-40 delivery and caching system & LAS
  - The BADC's Data Extractor web-interface
  - COCO (**CDMS** Overloaded for CF Objects)
  - IaGraph
  - and VCDAT of course!

## The CF-Checker (1)

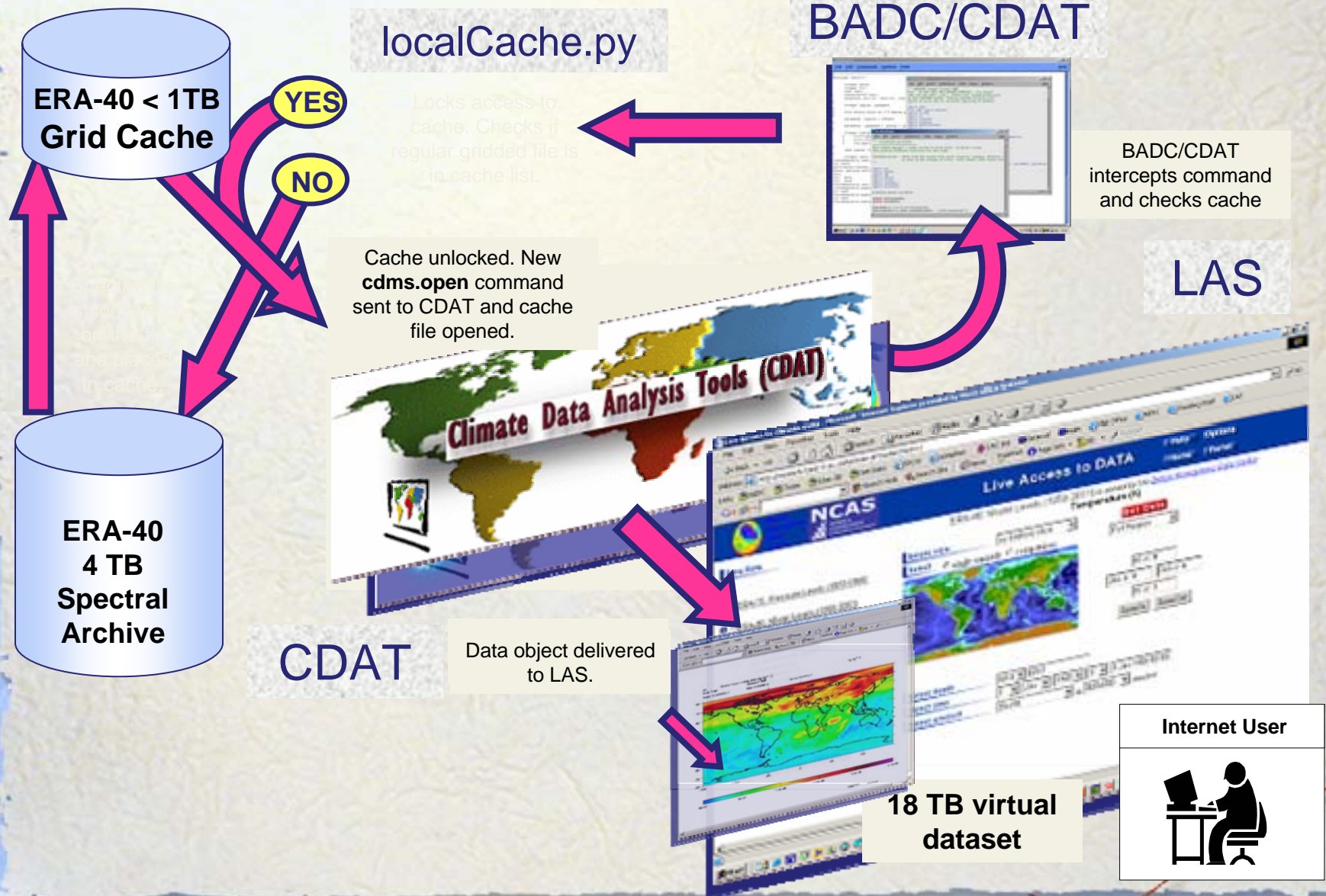
- Code developed in Python calling CDAT for NetCDF interface.
- BADC sub-classed the main version and bound it to a web application.
- Allowing users to upload a file to be checked for CF-compliance.
- Available at:  
<http://titania.badc.rl.ac.uk/cgi-bin/cf-checker.pl>

# The CF-Checker (2)

<div>Home My BADC Data Search Community Help!</div>	
<h2>CF-Convention compliance checker for NetCDF format</h2> <p>This form allows you to run the 'cfchecks.py' script to check that the contents of a NetCDF file comply with the <b>Climate and Forecasts (CF) Metadata Convention</b>. The CF-checker was written by Rosalyn Hatcher of the Hadley Centre for Climate Prediction and Research, UK Met Office. This work was supported by PRISM (PProgramme for Integrated Earth System Modelling).</p> <p>The CF-checker is a Beta release and development work is currently underway. If you have suggestions for improvement then please e-mail Rosalyn Hatcher (<a href="mailto:rosalyn.hatcher@metoffice.com">rosalyn.hatcher@metoffice.com</a>).</p>	
<p>To check your file, please enter the file name</p> <p>For details of the NetCDF format and the C</p> <p>File: <input type="text"/></p>	<h2>CF-Convention compliance checker for NetCDF format</h2> <p><a href="#">Check another file</a>   <a href="#">NetCDF format</a>   <a href="#">CF Convention</a>.</p> <hr/> <p><b>File name:</b> C:\Program Files\NetCDF\nc_files_for_CF_checker\ok.nc</p> <hr/> <p><b>Output of CF-Checker follows...</b></p> <pre>CHECKING NetCDF FILE =====  ----- Checking variable: o3 -----  ----- Checking variable: temp -----  ----- Checking variable: time -----  ERRORS detected: 0 WARNINGS given: 0</pre>
<div>Home Contact</div>	



# BADC ERA-40 delivery system



# BADC's LAS Demo: 1 month to NetCDF

**BADC Live Access Server**

Search:  **Go**

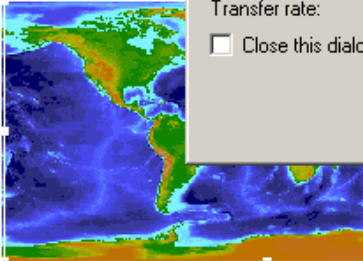
**single data set** **compare two**

**Datasets**  
**Variables**  
**Constraints**  
**Output**  
**Output Options**  
**Previous Output**  
**Define variable**  
**About**

**Datasets > ERA-40 Forecasts: Surface/single Levels (1958-2001, 1.0 deg)**  
**Variable(s): Large-scale snowfall (m of water equivalent)**

Select your desired variable(s):

**Select view:**  
**Select output:**  
**Select region:**



**Select time range:** 01 Dec 1 31 Dec 1

**File Download**

Saving:  
LASoutput.nc from titania.badc.rl.ac.uk

Estimated time left:  
Download to:  
Transfer rate:  
☐ Close this dialog

**Save As**

Save in: Desktop

My Computer  
My Network Places  
History  
Desktop  
My Computer  
My Network P...

avi2mpg  
Carys - work  
Chocolate-crunch Torte with Pistachios and Sour Cherries - recipes from Delia Smith\_files  
Delia Online Recipes\_files  
ERA-40 selector  
grace book  
My laptop settings  
RecipeSource Marble Chocolate Mousse\_files  
sodar\_macehead\_files

File name: LASoutput.nc  
Save as type: .nc Document

**Save** **Cancel**



## The BADC's Data Extractor web-interface (1)

- We found it hard to make progress with the LAS, due to:
  - dependence on many other software products (such as MySQL and Tomcat)
  - complex multi-language code – *very hard to locate where to modify code for minor changes.*
- So, we built our own...using **all-Python** of course...



# The BADC's Data Extractor web-interface (2)

Projection: Standard  
Dimensions: 600x400

Plotting your data...

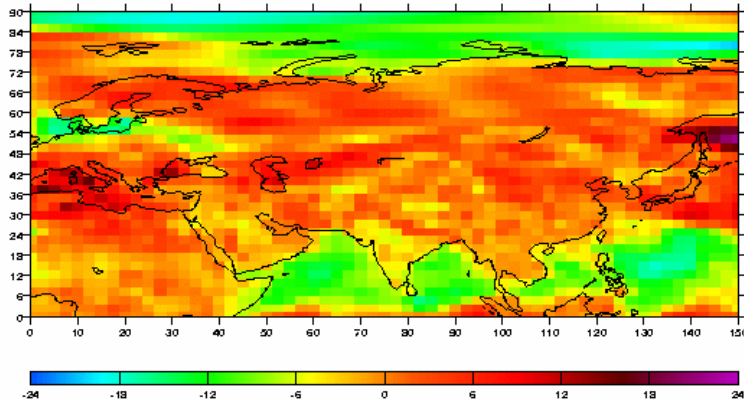
Request processed...



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Source: British Atmospheric Data Centre (<http://badc.nerc.ac.uk>)

new\_year Differenced dataset: no 10u - no 10u 1979/1/1 0:0:00  
Mean: -1.46611 Max: 21.3742 Min: -20.4533



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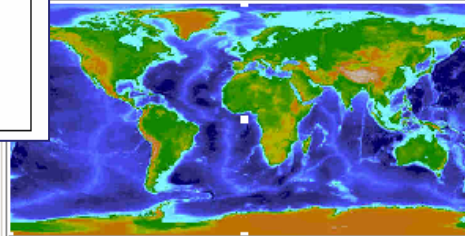
Dataset 2: -> ERA-40 -> Analyses on Surface/Single Levels (1.0 deg)

357.5 E

/cdat.badc.nerc.ac.uk/dx\_extra/LiveMap\_30/extractorMap.html - Microsoft ...

Choose this selection

VIEW: Longitude-Latitude



90.0 N

180.0 W

180.0 E

90.0 S

Zoom In

Zoom Out

Dataset 1: Start time  
1979 01 01 00 00 00  
year month day hour min sec  
1979 01 01 00 00 00  
End time

Format

NetCDF

Note that you should choose NetCDF format if

Proceed

## COCO (CDMS Overloaded for CF Objects )

- The Hadley Centre for Climate Prediction and Research had some requirements to tune/extend existing CDAT software.
- Developed COCO as part of the EU PRISM project.
- A pp I/O interface
- Adds variable methods such as:
  - collapse()** – a wrapper around `genutil.statistics` allowing users to provide a tolerance to missing data.
  - textract()** – reads a specific time slice of data using keyword value pairs and combinations:  
E.g.  

```
var.textract(year=[1980,1990], month=[1,7])  
# extracts Jan and July data for  
# months from years 1980 and 1990
```



# laGraph - A Python Package for Quick Interactive Graphing

This is my plot.  
By Johnny Lin  
December 2003

University of Chicago  
Climate Systems Center

My Plot

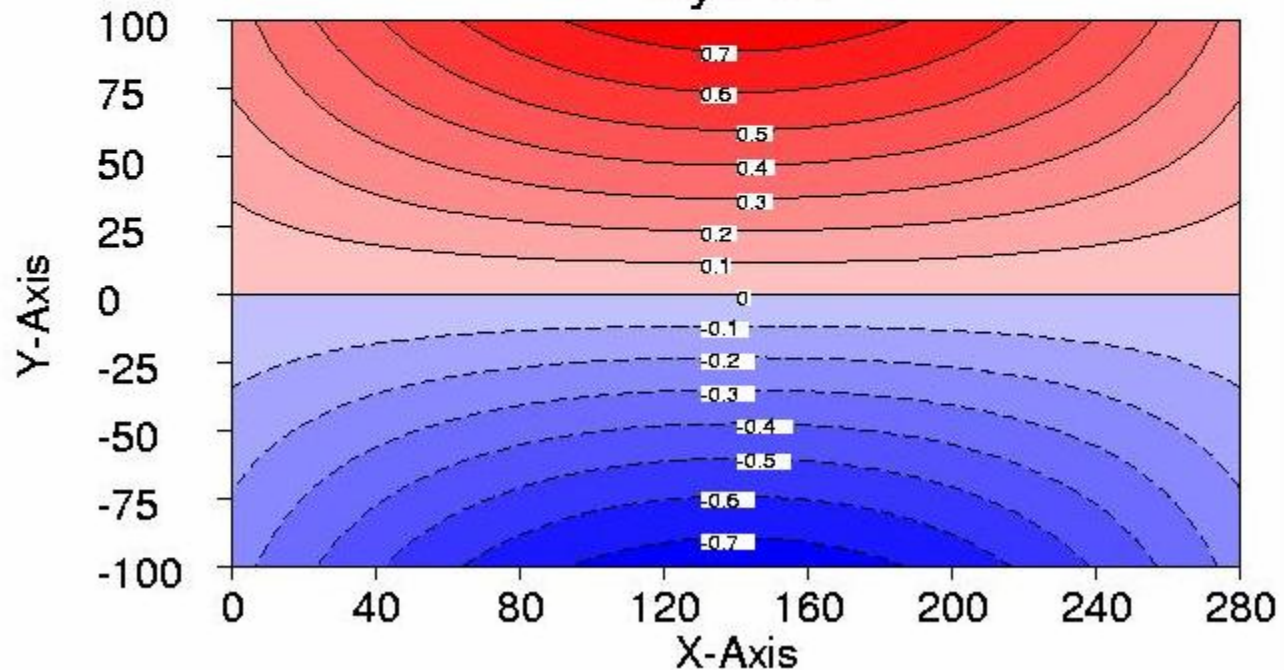


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Introduction

This is package version